P-193 Radiation dose from pelvic radiography: A comparison of three digital radiography (DR) systems

Andrew England[1]; Paula Evans[2]; Fergus Dunn[3]; Anthony Manning-Stanley[4]; Elizabeth Taylor[2]; Louise Harding[2]
[1]University of Salford; [2]Warrington & Halton Hospitals NHS Trust; [3]IRS Limited; [4]Salford Royal Hospital NHS Trust

Purpose: To compare the radiation dose and image quality between the three digital radiography (DR) systems when undertaking examinations of the pelvis.

Methods: Using a Carestream Directview, Siemens Ysio and a Samsung XGEO a series of antero-posterior (AP) pelvic images were obtained using a phantom. Images were acquired using 75 kVp, outer AEC chambers and the Source to Image Distance (SID) was varied from 115 to 140cm. The phantom was also imaged across two orientations, outer AEC chambers nearest the head and then the feet. Field size, centring point, grid usage and focal spot were fixed throughout the study. For each examination the mAs and source to skin distance were recorded. Entrance surface dose including scatter (ESD) and effective dose (ED) were calculated using the PCXMC software. The resultant images were independently assessed for image quality by two blinded observers using a previously established scoring system.

Results: The lowest ED (0.105 mSv) was achieved at 125 cm, outer AEC nearest the feet and when using Siemens DR. The highest dose (0.161 mSv) was at 105 cm, outer AEC chambers nearest the head and when using Samsung DR. When compared with a reference image (current acquisition parameters) the image obtained with the lowest ED was graded has having the similar image quality.

Conclusion: Based on the equipment and acquisition factors investigated there are differences in ED between DR systems. Such differences should be factored into dose optimisation strategies or attempts should be made to normalise doses between systems.

P-194 Chest radiography: Collimated view of the bases or a full repeat?

Andrew England[1]; Hannah Brookfield[2]; Anthony Manning-Stanley[3]
[1]University of Salford; [2]Aintree University Hospital NHS Trust; [3]Salford Royal Hospital NHS Trust

Purpose: The costophrenic angles/bases may be inadvertently excluded from a chest radiograph (CXR). The aim was to investigate the differences in effective dose (E) from performing a supplementary view of the bases or a full CXR repeat.

Methods: The Monte Carlo based dose modelling software PCXMC was used to estimate E. Within the software a series of clinical scenarios were simulated. They included 85kVp and 120kVp projections, all PA at 180cm and with fixed mAs (5 & 1.5, respectively). The field size within the software was adjusted to include the whole chest and then for a collimated view of the bases. For both kVp settings E was estimated for two full-field CXRs and a full-field CXR plus bases. Differences between the two scenarios were then assessed. Hypothetical patient age/genders were included in the modelling in order to investigate variations in risk of exposure-induced cancer death (REID).

Results: At 85kVp, E for two full-field CXRs and one full-field CXR plus bases were 0.034 and 0.026 mSv, respectively (23% difference). At 120 kVp, E was 0.028 and 0.021 mSv, for two full-field CXRs and one full-field CXR plus bases, respectively (25% differences). The greatest risk reduction was for women aged 18 when moving from two full-field projections to a single CXR plus bases.

Conclusion: Debate still exists regarding whether to undertake a collimated view of the bases or a full repeat. Evidence from this study suggests that a collimated projection of the bases is justified having a lower effective dose and risk.

P-195 A comparison of radiation dose and image quality for fixed tube current (FTC) and automatic tube current (ATC) CT methods for abdominal scanning

Maily Alrowily[1,2]; Andrew England[2]; Peter Hogg[23]
[1]Ministry of Health, Saudi Arabia; [2]University of Salford;[3]Karolinska Institute, Sweden

Background: Tube current is a determinant of radiation dose and image quality in CT scanning. Fixed Tube current (FTC) and Automatic Tube Current Modulation (ATCM) techniques are methods used to ensure acceptable radiation

dose and image quality during abdominal CT. The aim of this pilot study was to evaluate the radiation dose and image quality between FTC and ATCM techniques for abdominal CT techniques.

Materials/methods: Using a Toshiba Aquilion 16 CT scanner both an anthropomorphic abdominal phantom and an adult ATOM dosimetry phantoms were imaged using FTC and ATCM techniques. The ATOM was loaded with 271 thermoluminescent dosimeters (TLDs). Acquisitions were undertaken three times using the same parameters for each technique. Resultant image quality was assessed using signal-to-noise ratios (SNR) and contrast-to-noise ratios (CNR) for five organs (e.g. liver, pancreas, spleen, kidneys and gallbladder). Absorbed dose from each of the 271 TLDs were converted into organ and tissue doses and then effective dose based on ICRP 103.

Results: No difference was detected in mean physical image quality parameters between the FTC and ATCM techniques. (ATC SNR= 7.323 HU CNR=8.387 HU and FTC SNR=7.378 HU CNR=8.984 HU). There was a reduction in absorbed dose and effective dose between ATC and FTC (about approximately 25%).

Conclusions: When comparingradiation dose between ATC and FTC for options CT scans of the abdomen there is FTC lower than ATC. But both techniques however showed similar results in the physical evaluation of image quality.

P-196 Low dose 80kv CTPA in pregnancy: An audit of dose, positivity and diagnostic quality over 1 year

Bethan Harper; Andy Beale
Great Western Hospital, Swindon

Aims: All pregnant women with suspected PE's have a low dose CTPA as first line investigation at our Trust. We performed an audit of CTPA imaging in pregnancy over a one year period looking at Kv acquisition, dose (DLP), positivity and diagnostic image quality.

Method: A retrospective review of one year of CTPA's in pregnancy.

Results: 56 patients included. 50/56 (89%) had 80kv low dose scans with an average DLP of 49 (est 0.8 msV). 4 had 100kv scans and 2 had 120kv scan with an average dose of DLP 110 (1.8 msV) and 277(4.7 msV) respectively. All of the scans were of diagnostic quality and no patient required further evaluation. (There were 3 half dose perfusion scans undertaken in the same period, all 3 of which were normal.) There was one positive scan with bilateral PE's (an 80kv scan), the patient was 9 weeks pregnant, had bilateral PE's, presenting with Haemoptysis and SOB.

Discussion: Although 89% had low dose studies, 6 had higher dose acquisition. This was due to radiographer not selecting a low dose study. The findings have been fed back and we will re-audit next year.

The low dose, along with 100% technical success, indicates that 80kv low dose CTPA is justified in being the first line investigation of suspected PE in pregnancy. The low overall positivity rate of <2% suggests that we are over investigating PE's in pregnancy. We are now undertaking a national survey across other centres to see if our results are reproduced elsewhere.

P-197 DRLs and image quality – the challenge

Lynn Anslow; Denise Twist; Donagh White; David Anwyl
St Helens & Knowsley Teaching Hospitals NHS Trust

The establishment of local diagnostic reference levels is a requirement under

IR(ME)R 2000 (1). They have historically been produced using Dose Audit information from the Radiology Information System (RIS), which is dependent on a manual input for all data. Analysis of this data can be difficult and time consuming with limited access to dose related image quality.

We currently rely on assistance from our Radiation Protection Advisor (RPA) using our RIS data to establish out local DRL's. They use statistical data analysis to exclude outlying records.

An opportunity arose to trial a commercial dose estimating software package for a period of 2 months. This poster describes our experiences in using such software and our initial results. We will include advantages/disadvantages including establishing DRLs, image quality, real-time analysis, trends and time and costs. The software also allows the setting of alerts/dose level triggers. This feature sends an email to key members of staff when the pre-set dose is exceeded and allows audit of acknowledgements. Examinations can be further evaluated with software interaction to review image quality with high and low doses to produce a training needs analysis.

There is a proposal (1)by Public Health England to develop a national data collection system to capture imaging and radiology dose information to support national disease registration and Ionising (Medical Exposure) Regulation monitoring. The authors believe the availability of a local system will complement this national initiative. To comply with this, accurate and timely dose audit data is easily exportable for manipulation and further analysis when required.

References

1. Statutory Instruments. The Ionising Radiation (Medical Exposure) Regulations 2000. London : The Stationary Office Limited, 2000. SI 2000/1059.
2. Communication to Chief Executives dated 16/11/2015 from the Directors of Disease Registry, Radiation Protection and National Clinical Director for Diagnostics

P-198 Differences in effective dose from different paediatric CT brain scan protocols

Mohamed Benhalim[1]; Peter Hogg[2]; Katy Szczepura[2]; Andrew England[2]
[2]Faculty of Medical Technology, Misurata, Libya; [2]University of Salford UK

Purpose: To develop a method for estimating effective dose (ED) for paediatric CT brain examinations and apply it to evaluate differences between protocols.

Material/methods: An ATOM phantom representing a two year old child was implanted with metal oxide semiconductor field effect transducer dosimeters (MOSFET). Brain scanning was undertaken using a series of helical CT scans across a range of 54 protocols. Protocol variations included changes in rotation times, gantry angulation, tube current/potential and slice thickness. Absorbed tissue doses were read from the MOSFET system and the ED was calculated for each scan protocol.

Results: ED ranged from 1.01 mSv and 4.81 mSv, respectively. Organs located within the scan volume received the highest absorbed doses; however, organs in the periphery of the scan volume still received a significant radiation dose. ED trends encountered during the study were as follows: ED increased consistently by around 33% when increasing kVp from 100 to 120 (mean ED 2.35 SD 0.75 mSv versus 3.52 SD 1.21 mSv, respectively; $P<0.05$). Changes in gantry angle had minimal effect on ED. When moving from a zero gantry angle to +27 degrees the mean ED decreased by 0.04 mSv ($P>0.05$).

Conclusion: This study demonstrated that the most dominant factors affecting ED are tube current, tube potential and scan rotation time.

P-199 The use of secondary lead rubber protection in paediatric extremity radiographic examinations

Charlotte Bloomfield; Andrew England
University of Salford

Purpose: Although diagnostic X-ray examinations provide great benefits their use carries a small but not insignificant risk. For some radiographic examinations lead rubber shields are available to limit exposure. The use of lead rubber shields often varies between countries, departments, radiographers and can depend on the patient. The aim of this study was to evaluate the utility of a lead rubber shield in paediatric patients undergoing upper limb radiography.

Methods/materials: A full body paediatric anthropomorphic phantom was position for an antero-posterior (AP) elbow examination and exposed to ionising radiation using standard acquisition parameters. The skin dose was measured at five different anatomical locations (eyes, thyroid, flank and testes). Lead rubber was then placed over the pelvis and abdomen and the phantom was re-imaged. For each situation (with/without shielding) the exposure factors were sequentially increased.

Results: The skin dose received at the orbit, right flank and testes increased with increasing exposure factors when no shielding was applied. When shielding was applied no skin dose was measured at either the flank sites or testes for any exposure factor combinations. Eye and thyroid does were marginally higher when shielding was applied.

Conclusion: Secondary lead rubber may provide an option for reducing scattered radiation to the abdomen and pelvis during skeletal radiography in paediatrics. A more detailed understanding of the effects of this intervention on all organs and tissues is essential.

P-200 Out of hours CT scan request

Abeeku Hammond[1]; Narayanasamy Jeyagopal[1]; Eilis Macloughlin

[1]*The Royal Oldham Hospital*

Background: Despite the importance of CT scan to our daily medical practices, it is associated with significant risk not only to patients but staff as well. This re-audit aimed at finding out whether out-of-hours CT requests criteria met the 100% recommendation made by the initial audit and also to find out if the other recommendations were adhered to.

Methods: Retrospectively, out-of-hours CT request between 09:00pm and 11:59pm for the month of June 2015 was collected and various means was used to validate the data. Data was analysed using Microsoft excel.

Results: North Manchester General Hospital had the least referral in 2015 as compared to 2014 where they had the highest. CT of the head made up of about 90% of the CT request both in the initial audit and the re-audit. Fairfield General Hospital had the highest CT head referral. 75% of the request met the criteria, which was lower than what was achieved in 2014 (81.36%). Off those that met the criteria only 10% had positive findings. Those that had inconclusive information or did not meet the criteria had no positive findings.

Conclusion: Unnecessary CT scan request not only expose patient and staff to radiation, they also have a huge financial implication to the trust. Strict adherence to guidelines limits unnecessary exposures. Fairfield General Hospital had the highest CT head referral mostly as a result of the Stroke unit based there. With the exception of the re-audit, non of the recommendations were implemented.

P-201 A review of CT doses in trauma patients

Kate Hughes
Aintree University Hospital

Aims/objectives: To retrospectively look at doses for trauma 'PAN' scans and compare them to doses for similar scans in a non-trauma setting.

Content: Comparison of doses and presentation of percentage change for both 'PAN' scans and non-trauma scans, looking at causes of dose differences e.g. in trauma 'vac-sac', arms by sides, equipment attached, etc. Brief look at radiology reports and injuries detected on CT to find how many scans report no significant injury.

Relevance/impact: Best practice involves keeping doses 'as low as reasonably practicable'. We looked to see if we could implement any changes in practice to reduce doses e.g. deflation of 'vac-sac' if appropriate, raising arms above the head if patient condition allows.

Outcomes: Doses of CT heads were up to 62% higher and doses of CT chest/abdomen/pelvis up to 53% higher in trauma patients. This increase was partly due to the 'vac-sac' that patients are scanned in and partly due to patient positioning. Review of radiology reports found that 40% of scans found no significant injury, and 58% found either no injury or injury was limited to head or orthopaedic areas only.

Discussion: We could reduce the amount of dose received by trauma patients by deflating the 'vac-sac' before scanning and by raising patient's arms over their head for a chest/abdomen/pelvis. These areas of practice should be suggested to the clinician at the time of the scan and adopted by the radiographers wherever appropriate.

P-202 Thinking outside the box! The effects of collimation and dose reduction techniques on AP shoulder projections

Nicole Muscroft; Nadine Collier
Warrington and Halton Hospitals NHS Foundation Trust

The aim of the study is to investigate the effects of collimation on patient dose for AP shoulder projections.

The standard colimation technique when undertaking an AP shoulder projection is to keep the light box straight and rectangular to include all relevant anatomy.

Within the immediate surrounding area of the shoulder are the radiosensitive tissues; the breast and thyroid with the latter most susceptible to radiation-induced carcinogenesis; hence the importance of dose optimisation and utilising ALARP for this projection.

By changing the position of the light box to a diamond shape the thyroid and some of the breast tissue is excluded from the primary beam.

Our audit will investiagate the radiation dose between the different orientations.

P-203 Positioning for a conventional skyline patella projection: Evaluation of torso position and its relationship with eye lens and thyroid dose

Joanne Li; Katy Szczepura; Andrew Tootell; Andrew England
University of Salford

Purpose: Numerous techniques exist for acquire a skyline projections of the knee. Within these techniques it is common for the x-ray field to be directed towards the eyes and thyroid. The position of the torso may play a role in the dose received to these organs and this was investigated.

Methods and materials: A full body adult anthropomorphic phantom was positioned supine for a conventional skyline projection, the torso at 90 degrees in relation to the hip joint. Data for surface skin dose was recoded using a solid state dosimeter at the level of the eyes and thyroid gland. The angle of the torso was then adjusted in 15 degree increments and the phantom was re-imaged. Dose measurements were recorded and this continued until the torso angle was 180 degrees.

Results: When moving from 90 degrees to 180 degrees the dose to the eyes and thyroid was shown to increase, peaking at 135 degrees for the eyes and 105 degrees for the thyroid and then fell. Dose differences ranged from 0.0 to 0.168 microGy for the lens of the eye and 0.0 to 1.3 microGy for the thyroid, between torso positions.Conclusion: Torso position has been shown to effect the skin dose at the eye and thyroid levels during traditional skyline knee projections. Further work is needed to understand the effects of different exposure factors and also across a range of technique variations.

P-204 Radiation risk from screening mammography

Raed M.Ali[1,2]; Andrew England[2]; Andrew Tootell[2]; Claire Mercer[2]; Peter Hogg[2,3]
[1]University Of Kufa, Iraq; [2]University Of Salford; [3]Karolinska Institute, Sweden

Purpose: To present comparative effective lifetime risk data for different screening programmes worldwide.

Material/methods: Thermoluminescent dosimeters accommodated inside an adult dosimetry ATOM phantom were used to measure organs dose during screening mammography. The examined breast was simulated by using PMMA-Polyethylene phantom. Sixteen FFDM machines were used to expose the breast phantom in standard four-view screening mammography (craniocaudal and mediolateral oblique for each breast). Effective risk, the number of cancer cases produced by the exposure to X-radiation, was calculated for each machine and across 28 different screening programmes.

Results: Large differences in lifetime effective risk exist between different screening programmes throughout the world. The highest radiation risk results from the annual early onset US programme for 'high breast cancer risk' women, commencing at 25 years old. For this programme, the calculated total life time effective risk range from 911.3 to 1531.8 cases/106 women across the sixteen studied machines. The lowest lifetime effective risk was 56.1-94.4 case/106 women resulting from biennial screening mammography for women aged 50-64 years. Minor differences in effective risk were found amongst the different machines, but these differences were not significant statistically.

Conclusion: Significant differences in lifetime effective risk have been found between screening programmes throughout the world. These differences are mainly attributed to the onset age of screening mammography. Another less important factor is the time interval between the successive screens, since the tissues' radiosensitivity reduces with age.

P-205 What does mammography optimisation look like for computed radiography vs. a digital system?

Andrea Shemilt; Maria Robinson
Nottingham University Hospitals NHS Trust

It is the ongoing work of medical physics to optimise the performance of x-ray systems. When we talk about optimisation we can mean a range of activities, but in this context we are examining the balance between the risks of the radiation procedure and the benefits. This is especially important for breast imaging, where a healthy population is exposed to radiation for screening purposes. If image features aren't captured, a misdiagnosis could

occur, but with increasing dose we also increase the risk of inducing cancer in the future. A big concern with breast imaging is false-positives, resulting in unnecessary intervention, increasing healthcare costs and patient stress.

What parameters are we working with? How does optimisation appear for CR systems and digital systems? What differs and what is in common between the two modalities? This poster gives an overview on optimisation methodology and intends to paint a picture of the doses, threshold contrasts, spectra used for these systems, which will gives a strong idea of the sort of ballpark each operates within.

P-206 Weight based iodinated IV contrast dosing: A practical approach

Alf Troughton; Princemon Mathew; Justin Davies
Great Western Hospitals Foundation Trust

Introduction/aim: There is good evidence that tailoring IV CT contrast doses to patient weight in Chest/Abdo/Pelvic patients improves the images and may save contrast usage (Mott, 2015). This study reviews the feasibility of this approach in a busy DGH categorising patients into three broad groups by weight.

Method: The Department currently pump injects 65mls of 340 IV iodinated contrast strength at 2.5 mls/sec for all patients for CT CAP scanning followed by a saline chaser.

Prospectively 68 patients were divided into 3 weight categories. Each patient in each category was given one of three contrast doses -The usual volume or one of 2 others based outside experience.

40-60Kgs: 55mls-60mls-65mls
60-80Kgs: 60mls-65mls-70mls
80-100Kgs: 65mls-75mls-80mls

Images from each scan were reported independently by 3 consultant radiologists, (blinded to the dose), and assessed for image quality. If image quality was similar for two different doses, the lower dose was graded as optimal.

Results: 68 patients were scanned in total. For patients between 40-60kgs reducing the volume to 55ml was found to be optimal. Keeping our standard dose of 65mls was optimal for 60-80kgs patients, and it was 75mls for the 80-100kgs category.

Discussion: This study demonstrates an effective way to vary CT contrast dose by weight whilst maintaining diagnostic image quality. It uses a limited dose regime in a limited number of weight categories and therefore should be easy to implement. The three doses can be easily preloaded into the CT pump making the change simple to adopt in a busy department.

P-207 What is the failure rate in radiation governance checks on research involving ionising radiation, prior to the implementation of HRA single review?

Andrea Shemilt
Nottingham University Hospitals NHS Trust

The introduction of HRA Approval aims to provide “a single approval for research in the NHS that will incorporate an assessment alongside the independent Research Ethics Committee opinion.”[1] The approach to radiation governance at a trust level will therefore dramatically change, with responsibility for checks for radiation content, in documents like the protocol and the participant information, sitting with the HRA. HRA local process of assess-arrange-confirm means reviewing capacity and capability, making arrangements for the trial procedures and finally confirming that these elements are in place for trial start-up.

Before trust review, the REC has always reviewed participant information, trial protocol and REC form content, including the elements regarding radiation.[2] Individual ttrusts have reviewers to check trials for legislative compliance and local appropriateness as part of that site’s NHS Permission; however it is common for trust reviewers to find unacceptable deviation from the REC guidance. This means that non-compliances may be caught at the second layer of checks.

This work intends to capture a cross-section of causes for trial rejection at the radiation-checking stage, prior to the implementation of the HRA Approval single review process. The results will highlight areas to focus on in the radiation governance process, regardless of the body undertaking the checks. This should inform research applicants, local R&D staff as well as HRA reviewers as to the elements of research applications involving ionising

radiation that require increased scrutiny, in order to ensure a smooth path to trial start-up and thereby reducing patient- and trust-risk.

[1] Research support functions following HRA approval implementation, v1.0. HRA, 19 September 2014.
[2] Approval for research involving ionising radiation v2. NRES, September 2008.

P-208 Radiation, imaging and contrast – effects on cardiovascular system

Shah Sweni[1]; Ramachandran Meenakshisundaram[2]; Ponniah Thirumalaikolundusubramanian[3]
[1]Southend University Hospitals NHS Foundation Trust; [2]Queen's Hospital, Barking, Havering and Redbridge University Hospitals Trust; [3]Chennai Medical College Hospitals and Research Center

Objectives: To review and highlight the health effects of imaging (ionising and nonionising) – on cardiovascular system and increase awareness of implications.

Methods: All the relevant articles in the field were extensively reviewed to some up with a brief summary of potential toxicity.

Discussion: High dose ionising radiation affects the heart and large arteries (i.e., coronaries, carotids, and aorta) including – fibrotic pericardial damage, pericardial adhesions; microvascular damage; and stenosis of the valves. Low dose radiation (LDR) used in cardiac imaging has enough energy to induce DNA damage. LDR increases genomic instability in arteriosclerotic plaques thereby contributing to CVD by forming dysfunctional clones. Radiation-induced ultrastructural changes are seen in myocardial microvasculature.

Contrast media used in imaging increases stroke volume, cardiac output and left ventricular contraction. It decreases peripheral resistance and causes bradycardia. Patients with heart failure are at greatest risk of CM. Reduction of myocardial contractility secondary to myocardial chemotoxicity and changes in blood ionicity

In animals, MRI induces transitory arrhythmias and myocardial hyperpolarisation. In humans, reversible ventricular fibrillation and other arrhythmias may occur in susceptible individuals. The fast gradient-induced Magnetic fields in cardiac MRI can stimulate nerves, skeletal and cardiac muscles.

Conclusions: It is vital for physicians/radiologists to be aware of the possible hazardous effects of radiological investigations, especially with the advent of stronger fields in medical imaging.

P-209 A novel phantom for dental OPG systems

Adrian Walker[1]; Rachel Lamb[1]; Paul Charnock[2]; Annie Talbot[2]
[1]Leeds Test Objects Ltd; [2]Integrated Radiological Services Ltd

A survey of the image quality of dental OPG systems using Leeds Test Objects' TO PAN phantom.

A survey of numerous dental OPG systems to determine and compare the accuracy of the patient positioning system and image quality (contrast resolution and spatial resolution).

The unique capability of the TO PAN phantom to determine the correct position of the focal trough and thus allow the user to accurately and reproducibly position test features to allow an assessment of image quality. Using this phantom, a survey gives a comparison of commercially available OPG systems in regular use in the UK.

The survey shows a variation between the accuracy of patient positioning systems when compared to the standard focal trough. Image quality, when measured in the focal plane, varies for spatial resolution between 5-8LP/mm and for contrast resolution all of the contrast details were detected on each system in the survey.

The survey proves that good agreement of the imaging system's focal trough results in optimised image quality. The results for checking the accuracy of the patient positioning system show that the phantom is good at discriminating between well-aligned and poorly-aligned systems. The results for spatial resolution show that the phantom is capable of discriminating between systems of high and low spatial resolution. The results for contrast resolution show that there is a need to amend the phantom design in order to extend the details up to and beyond the contrast threshold.

P-210 Health professional awareness on radiation protection in Saudi Arabia

Mawya Khafaji[1]; Sarah Hagi[1]; Abeer Albar
[1]*King Abdulaziz University, Jeddah, Saudi Arabia*

Introduction: Exposure to ionising radiation is either background or technology-based. Diagnostic radiographs are the most common source of technology-based radiation exposure, and contribute 50% of the annual allowed dose received by individual. There are increasing data about risk of cancer associated with ionizing radiation used for medical purposes and that it has dose dependent effect on the human body. Physicians are not accurately aware about radiation dose received by their patients 1,2. Some tend to underestimate the radiation doses and others think it is not an important factor when choosing which modality to order.

Methodology: The study was conducted on health professionals of all levels at King Abdulaziz University Hospital. A modified version of a validated questionnaire by Reichmuth3 was used. Nine hundred questionnaires were distributed.

Results: Seven hundred and fifty two questionnaires were filled and returned (83.6%). Questionnaires with missing answers were excluded. The respondents were nurses (64.3%), (29%) were physicians of different level of education; the remaining (6%) are technicians and other staff. It included questions differentiating between ionising and non-ionising radiation, and the organ sensitivity. The average score is 37.6±25.0 in (significant at p 0.05). Nurses scored lowest compared to all. On the other hand, senior house officers scored highest among all.

Conclusion: The results indicated the inadequacy in their awareness. Continuous updated knowledge is required to assure no patient is exposed to unnecessary radiation and subsequent risk of developing cancer. Formal training is should be mandatory to raise the awareness and referral practice in imaging.

P-211 Utilisation of patient safety checklist in paediatric fluoroscopy: A full cycle audit

Mandela Thyoka; Amey Bedford; Ashok Raghavan
Sheffield Children's Hospital NHS Foundation Trust

Aims/objectives: To simultaneously assess (1) local adherence to patient safety checklist (PSC) utilisation in a paediatric fluoroscopy department and (2) the quality of the information filled on the PSC form. Following intervention, to re-assess the change in compliance.

Content: A patient safety checklist (PSC) modelled on the WHO surgical checklist was implemented for use on all fluoroscopic procedures in a single Paediatric Radiology Department. The PSC aimed to encourage good practice and enhance patient safety. An initial audit (Jan-Feb 2013) followed by adoption of recommendations for improved practice predated the re audit (Jan-Feb 2015).

Method: Two complete audit cycles reviewed data from a Paediatric Radiology Department of a single NHS Trust Paediatric Hospital. Intervention following the first cycle involved dissemination of the PSC amongst Radiologists and Radiographers in departmental meeting discussion.

Outcomes: Overall, 1285 fluoroscopic procedures (FP) were performed in the year leading to the 2nd cycle (Nov 2014 to Oct 2015) - 4FPs per day. Cycle 1 (Jan-Feb 2013): 120 FPs performed, 55% (81/120) had PSC forms completed and scanned onto PACS. Compliance to documentation of individual sections on the PSC form ranged from 70-100%. Cycle 2 (Jan-Feb 2015): 188 FPs performed, 47% (88/188) had PSC forms completed and scanned onto PACS. Compliance to documentation of individual sections on the PSC form ranged from 70-100%. The proportion of PSC forms that were completed were reduced from 55% to 47% however the proportion of forms scanned remained the same (46% versus 47%) between the two cycles.

Discussion: Use of PSC is an important adjunct to maximising patient safety during fluoroscopic procedures. However, we highlighted a better compliance with documentation of individual sections on these forms. The low utilisation of the PSC form in the two cycles necessitates further interventions to achieve current standards. The introduction of a structured “briefing and de-briefing” approach for each procedure may enhance compliance to PSC utilisation. A further audit will evaluate the value of this new intervention.

P-212 IRMER in practice

Natalie Thring[1,2]; Shahed Khan[2]
[1]RQMS Ltd; [2]Radiation Consultancy Services Ltd

We all know that any imaging service is required to have employer's procedures for IRMER, but what makes these procedures robust and how do we know that the staff fully understand them when carrying out their duties day to day?

Quality procedures require well thought out roadmaps for each required process, with contingencies for every variable suitably detailed for the staff having to enact them.

Evidencing that practices are compliant with the written procedures is vital. Active management of staff compliance provides confidence that documented procedures are being upheld. Mechanisms for active clinical governance and sharing lessons learnt from incident investigations to facilitate the communication amongst staff bodies provides the best protection against poor practices and poor compliance in any institution.

Clinical governance in the form of auditing, research and development and risk management all then go hand-in-hand to ensure that an appropriate cycle of oversight, review and improvement are culturally embedded in a workforce. These are principles are not only central to achieving accreditation against the imaging UKAS standards, but are necessary to promote active cooperation between services and staff members.

This approach then allows clinical leaders to be confident not only that the procedures they have devised are suitable and robust, but also that they have been tested and are proven to be effective.

P-213 Fluoroscopy survey development: Manufacturer's baselines

Jennifer Bullen; Ryan Jones
Integrated Radiological Services

Aims/objectives: Current fluoroscopy survey methods require several checks such as; manual kV, doses to II face and patient entrance dose. A number of these checks show similar information. This project should improve fluoroscopy survey methodologies by;

- Collecting data from over 100 surveys based on 6 different manufacturers
- Calculating statistics for each manufacturer and individual models.
- Extracting data from previous survey files. All data collected will be tabulated in a spreadsheet.
- Developing baselines to help with routine/commissioning work.
- Improving image quality checks currently performed by subjective human reading.

Content:

- How baselines were developed and compared to IPEM 91.
- How manufacturers differ and the baselines most suitable for each will be presented.

Relevance/impact: Commissioning and acceptance tests are a requirement. By achieving baselines for individual manufacturers, comparison can be done against baselines currently used for survey as described in IPEM 91:

- Phantom: Remedial = ± 25% or >50mGy min-1
  Suspension = ± 50% or >100mGy-1
- II Face: Remedial = ± 25%
  Suspension = ± 50%

Outcomes:

- Survey templates used in QA testing will be improved.
- Baselines will be set for each manufacturer based on previous survey work.
- Survey methods can be reviewed and improved.

Discussion: Improving survey methods for routine/commissioning checks will be beneficial for future fluoroscopy QA testing. This will help to develop accurate baselines which are tailored for each manufacturer.